REMARKS

Claims 1-3, 5-18, 23-25 and 37-39 are pending in the present application. Reconsideration is respectfully requested.

1. Claims 23 and 24 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by DE 297 23 309 U1 (DE '309).

No anticipation due to missing element in DE`309: Applicants discussed this rejection with the Examiner during the February 12, 2009 interview and it was agreed that with the amendment of claims 23 and 24 to make it even clearer that the recited power output is generated by those thermocouples formed on the single substrate this rejection is now moot.

No obviousness due to missing element in DE`309: Also as discussed, DE'309 does not suggest use of a single substrate and in fact teaches away from use of a single substrate, asserting that coiling or folding the substrate is damaging (see our discussions on this issue in prior Responses, e.g., Amendment filed November 27, 2007, at p. 8, and the Amendment filed May 20, 2008, at p. 6). As discussed throughout the DE`309 reference, polyimide films are used to increase the density of the device by stacking multiple films. (DE`309 English translation, p. 2. Para. 2.)

2. Claims 1-3, 5-10, 12-15, 17, 18, 23-25 and 37-39 are rejected under §103(a) as allegedly being obvious in view of the combination of Migowski (WO 89/07836) and Buist (4,859,250).

Applicants traverse these rejections for at least the reasons below.

Claim 1 has been further amended to recite not just a thermoelectric power source comprising a plurality of thermoelectric couples comprising p-type and n-type thermoelements, wherein the p-type or the n-type thermoelements comprise Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y wherein x and y form a non-stoichiometric compound and x is about 2 and y is about 3, but also to recite that the non-stoichiometric compound is present in greater than an incidental amount.[1]

[1] The Examiner will recall that during the interview of February 12, 2009, the Examiner commented that all compounds, although primarily or virtually completely stoichiometric, may contain a trace or incidental amount of non-stoichiometry due to imperfections in the crystallization structure.

Support for the most recent amendment is inherent in the disclosure. Specifically, in several places in the specification Applicant discusses the co-sputtering or simultaneous sputter deposition from two different targets, such as at p. 10, lines 6-10; p. 12, line 28 – p. 13, line 5; Fig. 11 and Examples 1 and 2. Co-sputtering necessarily results in a compound that is primarily non-stoichiometric.

As can readily be seen by reviewing the attached articles, with the co-sputtering deposition process at substrate temperatures and other sputtering parameters as disclosed in the present application, a primarily or completely non-stoichiometric thin film compound will be formed. (See C W Sun et al., Crystallization Behavior of Non-Stoichiometric Ge–Bi–Te Ternary Phase Change Materials for PRAM Application, *J. Phys.: Condens. Matter,* 19 446004 (2007); and Dong-Ho Kim, Eungsun Byon, Gun-Hwan Lee and Sunglae Cho, Effect of deposition temperature on the structural and thermoelectric properties of bismuth telluride thin films grown by co-sputtering, *Thin Solid Films,* Vol. 510, Issues 1-2, 3, Pp. 148-153 (July 2006).)

As stated in Applicant's specification, the non-stoichiometric composition of the p-type and n-type thermoelements is obtained by the disclosed co-sputtering methods (simultaneous sputter deposition using two or more targets), which are non-equilibrium processes (see, e.g., p. 12, lines 28-30). Changing parameters and conditions, including the chamber pressure, the substrate temperature, the deposition rate, the power supplied to the targets, and the reactive gas pressure during the co-sputtering of target materials provides the recited non-stoichiometric Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y compositions. Variation of these parameters allows the fabrication of the recited thermoelements having desirable thermoelectric, electric and thermal properties – that is, the non-stoichiometric co-deposits provide thermoelectric power that greatly exceeds that of purely stoichiometric deposits. FIG. 11 illustrates how the electrical conductivity and the Seebeck coefficient vary as the Bi_xTe_y and Sb_xTe_y compositions change.

Migowski neither teaches nor suggests p-type or the n-type thermoelements comprising Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y wherein x and y form a non-stoichiometric compound and x is about 2 and y is about 3. Buist, cited by the Examiner as making up for the deficiencies of Migowski, also fails to teach or suggest p-type or the n-type thermoelements comprising Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y wherein x and y form a non-stoichiometric compound and x is about 2 and y is about 3.

Even if, *arguendo*, a contention that Buist discloses thermoelements comprising Bi_xTe_y, Sb_xTe_y, or Bi_xSe_y wherein x and y form a non-stoichiometric compounds, as recited in amended

claim 1 (which it does not) was taken as correct, Buist fails to act as prior art for such a contention because Buist does not enable the making of such thermoelement compositions. **There is no anticipation or prima facie obviousness if there is not also enablement of that for which the art is cited**.

> "In determining that quantum of prior art disclosure which is necessary to declare an applicant's invention 'not novel' or 'anticipated' within section 102, the stated test is whether a reference contains an 'enabling disclosure'... ." *In re Hoeksema,* 399 F.2d 269, 158 USPQ 596 (CCPA 1968). The disclosure in an assertedly anticipating reference must provide an enabling disclosure of the desired subject matter; mere naming or description of the subject matter is insufficient, if it cannot be produced without undue experimentation. *Elan Pharm., Inc. v. Mayo Found. For Med. Educ. & Research*, 346 F.3d 1051, 1054, 68 USPQ2d 1373, 1376 (Fed. Cir. 2003).

Accordingly, claim 1 is allowable over the art of record and withdrawal of the rejection is respectfully requested.

Claim 2 as previously amended recites, in part, a thermoelectric power source comprising, in part, sputter deposited thin film p-type and n-type thermoelements, wherein the p-type or the n-type thermoelements have L/A ratios from about 500 cm^{-1} to about 10,000 cm^{-1}. (Support for this amendment is in the specification at, e.g., p. 4, lines 1-3 and 15-16.) Neither Migowski nor Buist teach or suggest such an L/A ratio.

The L/A ratios are critical parameters of the claimed devices and such criticality is disclosed in the present application. Please see the § 1.132 Declaration of John DeSteese supporting this statement. Neither Migowski nor Buist nor any other reference of record, teach or suggest such L/A ratios or even recognize the importance of such a ratio and as such, claim 2 is not obvious and is allowable over the art of record.

Claims 3, 5-10, 12-15, and 17-18 are allowable for at least the same reasons as set forth in regard to claims 1 and 2.

Claim 23-25 as previously amended recite, in part, a thermoelectric power source comprising multiple thermocouples electrically connected to one another; the thermocouples comprising sputter deposited thin film p-type and n-type thermoelements having thicknesses of about 0.1 mm or greater. As noted by the Examiner, Migowski discloses much thinner (by orders of magnitude) thermoelements (p. 4, layer thickness of 0.005 mm) and asserts that the layers be as thin as possible. Buist does not disclose a layer thickness at all – completely failing to recognize the importance of this parameter. Furthermore, neither reference teaches or

suggests how to achieve such thicknesses – prior art must be enabling to be considered to teach or suggest a feature.

The thicknesses of the thermoelement as recited in the presently claimed device is critical to the operation of the device as the thermoelement thickness, along with other parameters of the thermoelement, determines the ultimate TE power source output. Please see the § 1.132 Declaration of John DeSteese supporting this statement.

Accordingly, claims 23-25 are allowable over the art of record.

Claims 37-39 are herein amended to recite the p-type or the n-type thermoelements comprise Sb_xTe_y or Bi_xSe_y wherein x is about 2 and y is about 3. Nothing in Migowski or Buist teach or suggest Sb_xTe_y or Bi_xSe_y thermoelements.

Claim 38 recites the thermoelectric power source of claim 37 wherein the p-type thermoelements or the n-type thermoelements are at least about 1 mm in length and at least about 0.1 mm in width. Neither Buist nor Migowski teach or suggest such dimensioned thermoelements. The Examiner asserts that such dimensions are merely a design choice – this contention is incorrect. Such dimensions are critical as stated in the § 1.132 Declaration of John DeSteese.

Conclusion

The Examiner is requested to please review the additional arguments set forth in the prior Amendment filed on January 2, 2009 as certain arguments were not re-iterated herein but may not yet have been reviewed by the Examiner.

Respectfully submitted,

KLARQUIST SPARKMAN, LLP

By _____

Lisa M. Caldwell
Registration No. 41,653

One World Trade Center, Suite 1600
121 S.W. Salmon Street
Portland, Oregon 97204
Telephone: (503) 595-5300
Facsimile: (503) 595-5301